

5.0 SHORELINE & STREAMBANK ALTERATIONS

5.1 **Policy.** It is the policy of the District to:

- 5.1.1 Encourage the establishment and maintenance of natural vegetation on shorelines and streambanks and discourage use of other alteration of a shoreline or streambank unless erosion of the shoreline or streambank is occurring.
- 5.1.2 Assure that improvements or alterations of shoreline and streambank areas comply with accepted engineering principles to prevent erosion.
- 5.1.3 Preserve and, wherever feasible, enhance the ecological integrity and natural appearance of shoreline and streambank areas.

5.2 **Regulation.**

- 5.2.1 No person shall construct or install a shoreline or streambank stabilization partially or wholly below the ordinary high water mark of (a) a natural or altered natural watercourse defined as a public water; or (b) a waterbasin, without first securing District approval and, if required, posting a financial assurance. Construction or installation of a shoreline or streambank stabilization wholly above the ordinary high water mark of a waterbody may require a permit under Rule 7.0.
- 5.2.2 Notwithstanding subsection 5.2.1, a District permit under Rule 5.0 is required only if:
 - (a) a Minnesota Department of Natural Resources public waters work general permit covering shoreline and streambank alterations is in effect; and
 - (b) the general permit excuses from the DNR individual permit requirement property owners that hold a District permit.

5.3 **Criteria for Bioengineering.** The use of bioengineering is encouraged as an alternative to traditional engineered stabilization techniques for its cost advantage and ecological integrity. Bioengineering techniques should be used to the maximum extent possible under the following criteria.

- 5.3.1 The resultant project shall be structurally stable. Special emphasis shall be given to the stability of the toe of slope and protection of the shoreline and streambank during vegetation establishment.
- 5.3.2 Native vegetation shall be used in all cases. Preferable species include those that form dense root systems or can be planted from cuttings.
- 5.3.3 Bioengineering projects shall include a long-term maintenance plan which will ensure that small erosion spots are corrected and that establishment of native plant materials is successful.

5.4 **Bioengineering Required Exhibits.** The following exhibits shall accompany the

bioengineering permit application (one full-size; one set-reduced to maximum size of 11" x 17"):

- 5.4.1 Site plan showing property lines, delineation of lands under ownership of the applicant; delineation of the existing shoreline; delineation of wetland within the project area; existing contour elevations (if available); and locations and lineal footage of the proposed bioengineering treatment;
 - 5.4.2 Site plan prepared by a professional engineer, landscape architect registered in the State of Minnesota, or other qualified professional experienced in the field of shoreline and stream restoration detailing the proposed bioengineering treatment, drawn to scale, with the horizontal and vertical scales noted on the drawing. The detail should show the finished slope, distance lakeward of the bioengineering treatment, ordinary high water level elevation and material specifications; and
 - 5.4.3 Detailed planting plan using native vegetation.
- 5.5 Criteria for Rip Rap Placement.** The District favors the use of bioengineering techniques and combined bioengineering/riprap for as much of a shoreline stabilization project as fetch, slope, soil and other relevant conditions allow. Live plantings incorporated in shoreline bioengineering must be native aquatic vegetation and/or native upland plants. For those parts of a stabilization project for which riprap is proposed, a permit applicant must evaluate the use of bioengineering techniques, as well as a combination of bioengineering and riprap, and show that they have been determined to be unsuitable. In addition, rip rap placement shall comply with the following criteria:
- 5.5.1 Rip rap material is to be durable, natural stone common to the setting and of a gradation that will result in a stable shoreline embankment able to withstand ice and wave action.
 - 5.5.2 The finished slope of the rock fragments, boulders and/or cobbles should not be steeper than a ratio of three (3) feet horizontal to one (1) foot vertical (3:1) under normal conditions. Steeper slopes will generally require larger sized rip rap. The finished slope shall be no steeper than 2:1 (horizontal to vertical). Any rock/boulder stabilization project with a proposed finished slope steeper than 2:1 (horizontal to vertical) shall be evaluated in accordance with the conditions for retaining walls.
 - 5.5.3 No rip rap or filter materials is to be placed more than (six) 6 feet waterward of the shoreline measured from the ordinary high water level (OHW) elevation under normal conditions. The encroachment into the water is the minimum amount necessary to provide protection and may not unduly interfere with the flow of water.
 - 5.5.4 A transitional layer consisting of graded gravel, at least six (6) inches deep, and an appropriate geotextile filter fabric shall be placed between the soil material of the existing shoreline and the rip rap to prevent erosion of the embankment and to prevent settlement.
 - 5.5.5 Rip rap placement shall not be attempted when underlying soils are not capable of supporting resulting loads. In these cases, a professional engineer registered in

Minnesota should be consulted.

- 5.5.6 The thickness of the rip rap layers shall be at least 1.25 times the maximum stone diameter, exclusive of toe boulders at least fifty (50) percent buried.
- 5.5.7 The rip rap shall conform to the natural alignment of the shoreline (i.e., maintaining an undulating or meandering shoreline).
- 5.5.8 The design must reflect the engineering properties of the underlying soils and any soil corrections or reinforcements. For a shoreline, the design must conform to engineering principles for wave energy dispersion and resistance to deformation from ice pressure and movement, considering prevailing winds and fetch. For a streambank, the design shall conform to engineering principles for the hydraulic behavior of open channel flow, considering channel slope, velocity, tractive forces and upstream and downstream impacts.
- 5.5.9 Rip rap placement projects shall contain native vegetation planting within the rip rap in an area equal to or greater than twenty-five (25) percent of the overall area of the rip rap. The native vegetation planting plan shall be approved by District staff.
- 5.5.10 Materials used shall be non-polluting.

5.6 Rip Rap Required Exhibits. The following exhibits shall accompany the rip rap permit application (one full-size; one set-reduced to maximum size of 11" x 17"):

- 5.6.1 Site plan showing property lines, delineation of lands under ownership of the applicant; delineation of the existing shoreline; delineation of wetland within the project area; existing contour elevations (if available); and locations and lineal footage of the proposed rip rap treatment;
- 5.6.2 Cross-section detailing the proposed rip rap, drawn to scale, with the horizontal and vertical scales noted on the drawing. The detail should show the finished rip rap slope, transitional layer design and placement, distance lakeward of the rip rap placement, ordinary high water level elevation and material specifications;
- 5.6.3 Description of the underlying soil materials that will support the rip rap and, if the underlying soils will not support the rip rap, the recommendations of a qualified soils engineer;
- 5.6.4 Gradation, average diameter, quality and type of rip rap material to be used (normally, a Class III gradation is sufficient);
- 5.6.5 Gradation, quality and type of filter blanket material to be used (normally, Type I gradation is sufficient);
- 5.6.6 Manufacturer's material specifications for proposed geotextile fabric(s);
- 5.6.7 Detailed planting plan for native vegetation planting element of the project; and
- 5.6.8 Narrative and supporting documentation assessing the feasibility of bioengineering for the site.

5.7 Criteria for Retaining Walls.

- 5.7.1 A shoreline or streambank structure with a finished slope steeper than 2:1 (H:V), including but not limited to a rock, boulder or masonry installation, seawall, sheetpile structure or gabion basket, is subject to this section. A single course of riprap or other permanent material less than eighteen (18) inches in height is excepted.
- 5.7.2 A new retaining wall, or repair/reconstruction of an existing retaining wall that increases floodplain encroachment beyond that required by technically sound and accepted repair/reconstruction methods, is permitted only pursuant to a variance. The applicant must demonstrate there is no adequate stabilization alternative.
- 5.7.3 The location of the finished wall shall be verified with a certificate of survey prepared by a registered land surveyor,

5.8 Retaining Wall Required Exhibits. An application for retaining wall installation must contain an analysis of alternative solutions in addition to a structural/geotechnical analysis prepared by a professional engineer, practicing in civil engineering and registered in the State of Minnesota, showing that the design conforms to accepted engineering principals and will withstand expected ice and wave action and earth pressures.

5.9 Criteria for Laying Sandblankets. All permitted sandblanketing shall comply with the following standards.

- 5.9.1 The sandblanket installation shall comply with section 4.8 and the standards of the DNR for placement of a sandblanket without a public waters work permit.
- 5.9.2 Beaches that are operated by governmental entities, and available to the general public, shall be exempted from the following restrictions: (i) that sandblankets be no more than fifty (50) feet in width and (ii) that sandblankets be installed no more frequently than once every four years.
- 5.9.3 A natural zone of native shoreline plants of the same depth and equal to twenty (20) percent of the width of the sandblanket should be maintained adjacent to the sandblanket.

5.10 Sandblanket Required Exhibits. The following exhibits shall accompany the sandblanket permit application:

- 5.10.1 Site plan showing property lines, delineation of the work area, existing elevation contours of the adjacent upland area, delineation of wetland within the project area, ordinary high water elevation, and regional flood elevation (if available). All elevations must be reduced to NGVD (1929 datum); and
- 5.10.2 Profile, cross-sections and/or topographic contours showing existing and proposed elevations and proposed side slopes in the work area. (Topographic contours should be at intervals not greater than one (1) foot);

5.11 Criteria for Streambank Stabilization. Intact, vegetated and stable shorelines and

streambanks provide valuable functions to the associated water resource including prevention of erosion, reinforcement of soils through root structure, trapping of nutrients and sediments, and provision of fish and wildlife habitat. The CLFLWD promotes the preservation and enhancement of the ecological integrity and natural appearance of shorelines and streambanks with the intent of preventing erosion. When alteration is necessary, the CLFLWD encourages bioengineering, landscaping and preservation of natural vegetation practices.

All proposed streambank stabilization and restorations shall be designed with and in response to an intimate understanding of the aforementioned characteristics unique to the stream reach in question. The physical appearance and operation character of a stream is a product of the adjustment of the stream's boundaries to the magnitude of stream flow and erosional debris produced from the contributing watershed. The individual stream characteristics are further modified by the influence of channel materials, basin relief, and other features of valley morphology along with a local history of land use and sediment deposition.

The unique characteristics of each stream reach shall be fully considered in the design of a streambank stabilization.

5.12 Streambank Stabilization Required Exhibits. The following exhibits shall accompany the streambank stabilization permit application:

- 5.12.1 Site plan prepared by a professional engineer or a landscape architect registered in the State of Minnesota and experienced in the field of stream restoration showing property lines; the ordinary high water (OHW) elevation and floodplain elevation; existing streambank and contour elevations;
- 5.12.2 Stream cross-section(s) depicting entire floodprone width; detailing channel dimensions, such as bankfull stage and the dimension and placement of the proposed stabilization/restoration measure(s). A longitudinal profile depicting the thalweg and top of bank; detailing the dimension and placement of the proposed stabilization/restoration measure(s);
- 5.12.3 Material specifications including plant species and whether species are rooted, seed or cutting;
- 5.12.4 Stream classification and design calculations and documentation; and
- 5.12.5 Detail of proposed site-specific erosion and sediment control practices.

5.13 Other Shoreline Improvements. Types of shoreline improvements not specifically addressed by Rule 5.0 shall require a variance.